

## SIPHONAPTERA FROM WESTERN AUSTRALIA.

BY MIRIAM ROTHSCILD.

(With 19 text-figures.)

THIS interesting collection of Siphonaptera was sent to us by L. Glauert, in whose honour the new genus is named and to whom we tender our very best thanks. In addition to the new fleas described below, the collection contained some other species which we record here.

1. *Echidnophaga perilis* Jordan 1925.

5 ♂♂, 7 ♀♀, off *Thalacomys lagotis* Reid 1836, from Perth.

2. *Echidnophaga aranka* nov. spec. (text-figs. 1, 4, 5).

A pair was obtained off *Bettongia lesueuri* Quoi & Gaim. 1824, from Beverly, South-West Australia. This species is closely related to *E. macronychia* J. & R. 1906, with which it is compared in the following description.

♂♀. *Head*.—Angle of frons situated lower down, the proportional distance of the angle from the base of the antennal groove and the oral angle is 18 : 11, and in *E. macronychia* 14 : 17. Frontal marginal incassation longer. Outline of frons from tubercle downwards straight or faintly concave. Genal process smaller, rounded off, and less curved backwards. Occiput, along dorsal line, about equal in length to the frons above the tubercle in ♂ and  $\frac{1}{8}$  shorter in ♀. Longest bristle of second antennal segment reaches a fraction beyond posterior margin of head. Maxillary palp reaches to apex of forecoxa; proportional lengths of segments: ♂ 14-11-10-18; ♀ 15-13-12-18.

*Thorax*.—Lobe of pleura of prosternite shorter, not prolonged into a point. Metepimerum with 3 to 5 bristles in a row.

*Abdomen*.—As in *E. macronychia*. Sternite VII in ♂ with about seven slender hairs (each side).<sup>1</sup>

*Legs*.—Forecoxa broader, with hindmargin more strongly rounded. Proportional length and width (at widest) 39 : 20 (in *E. macronychia* 40 : 17). Hindcoxa with patch of 16 to 22 spines on inner surface. Lateral row of bristles on hindfemur with only 3 or 4 very weak bristles on inner surface. Foretibia with largest apical dorsal bristle only reaching apex of third tarsal segment. Two stout bristles at dorsal apical angle of the midtibia, the longest of which reaches to the middle of third tarsal segment; in *E. macronychia* it only reaches to apex of second. Hindtibia with fifth dorsal incision greatly reduced or absent; 8 or 9 strong bristles only, along the dorsal margin. Tarsi broader than in *E. macronychia*. Fifth segment of all tarsi with four pairs of lateral bristles, instead of five. First, second, and third segments of foretarsus of approximately equal lengths, the fourth a shade shorter. Second midtarsal segment only  $\frac{1}{4}$  longer than first, instead of half as long again. Longest dorsal apical bristle of second hindtarsal segment does not quite reach to middle of 5th segment,

<sup>1</sup> Unless otherwise stated, all figures refer to both sides together.

while in *E. macronychia* it extends at least to apex of 5th segment. Basal projection of claw as large as in *E. macronychia*.

*Modified Segments*.—♂ (text-fig. 4): Stigma cavity  $\frac{2}{3}$  length of antepygidial bristle. Sternite VIII bears three bristles in a row at right angles to ventral margin, situated some distance from distal margin; two upwardly curved bristles along ventral margin and 3 or 4 fine hairs situated irregularly on outer surface. Apical margin incurved above ventral apical angle. Manubrium of

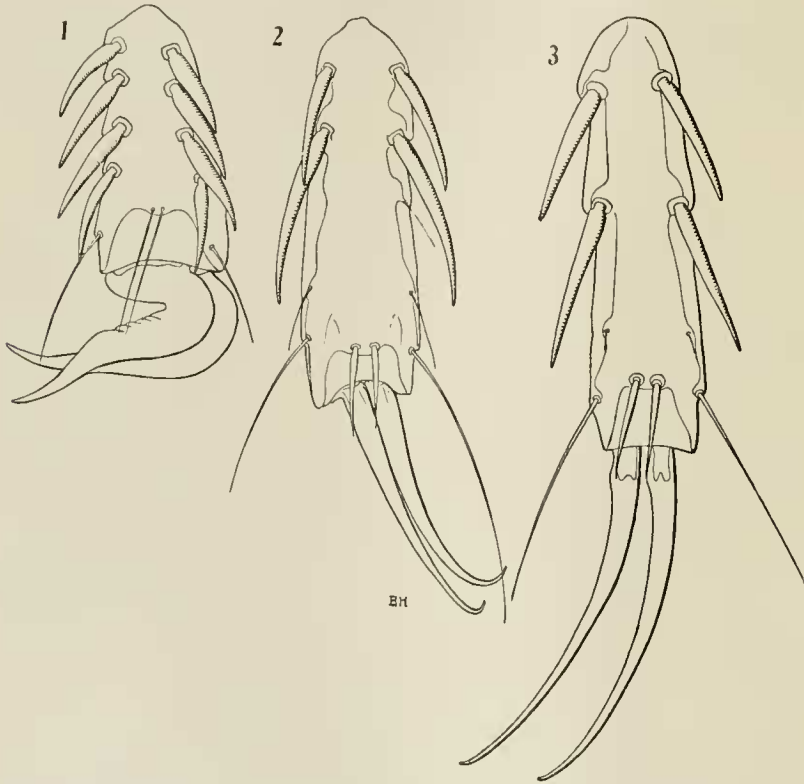


FIG. 1.—*Echidnophaga aranka*, midtarsal segment V, ♂.

FIG. 2.—*Echidnophaga ambulans ambulans*, hindtarsal segment V, ♂.

FIG. 3.—*Echidnophaga ambulans inepta*, hindtarsal segment V, ♀.

clasper slender, somewhat resembling that of *E. liopus* J. & R. 1906, except that terminal portion not turned upwards. Process P straighter than in *E. macronychia* with one thin longish bristle at ventral apical angle, and two more slender ones, equidistant from each other, on ventral surface, besides a number of apical and dorsal bristles. Process P<sup>2</sup> much shorter than in *E. macronychia*; its dorsal margin slightly convex, somewhat as in *E. liopus*. Finger F with ventral margin rather more strongly curved than in *E. macronychia*.

♀: Tergite VIII with fairly regularly rounded outline as in *E. macronychia*. Several bristles on outer surface near margin at apex, and one short, stout, very conspicuous spine-like bristle above these on inner surface. Stylet broader in

comparison with its length (ratio 7 : 5 compared with 7 : 4). In addition to the long terminal bristle, two bristles placed on ventral margin of stylet, of which the proximal one is considerably the longest. Receptaculum seminis very much larger (text-fig. 5) than in *E. marconychia* (text-fig. 6).

Length : ♂ 1.4 mm. ; ♀ 2 mm.

3. *Echidnophaga ambulans inepta* nov. subspec. (text-fig. 3).

2 ♀♀, off *Tachyglossus aculeatus ineptus* Thomas 1906, from Nolba near Geraldton. This is probably the West Australian subspecies of *E. ambulans*

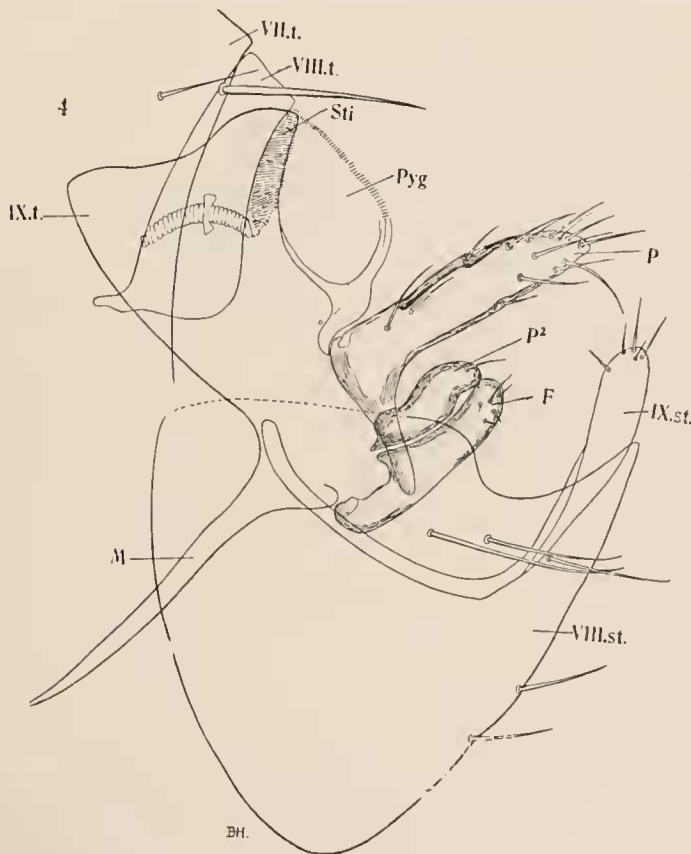


FIG. 4.—*Echidnophaga aranka*, end-segments of abdomen of ♂.

Olliff 1886. The main character for purposes of identification is the arrangement of the bristles of the fifth tarsal segments. The two pairs of stout lateral bristles are placed considerably farther apart (text-fig. 3), the second pair being situated slightly proximal to the middle of the fifth segment of the tarsus. In *E. ambulans* (text-fig. 2) the second pair is situated one-third from the base.

4. *Nosopsylla londiniensis* Rothschild 1903.

2 ♂♂, off *Tarsipes spenserae* Gray 1842, from King River, near Albany.

5. *Acanthopsylla woodwardi* Rothschild 1904 (text figs. 7, 8).

*Ceratophyllus woodwardi* Rothschild, Nov. Zool., xi, p. 623, no. 16, tab. 10 fig. 41, tab. 11 fig. 42 (1904) (Perth).

*Acanthopsylla woodwardi* Jordan and Rothschild, *Ectoparasites*, i, p. 242 (1922).

1 ♂, off *Dasyurus geoffroyi* Gould 1870, from Cannington, near Perth.

*Head*. Anterior row of frons with two spiniform bristles of which the lower

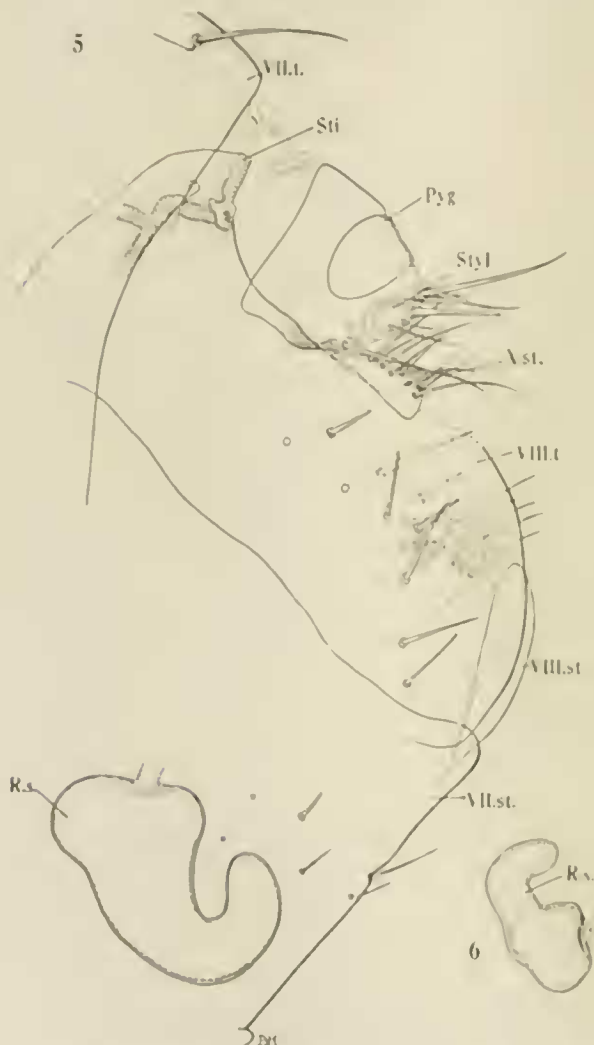


FIG. 5.—*Echidnophaga aranka*, end segments of abdomen of

FIG. 6.—*Echidnophaga macronychus*, roscapularium sensillum

is the longer, above them 1 stout bristle and below 3 medium sized bristles. In addition numerous fine bristles scattered over frons, and 7 stout ones, of which 3 are notably stronger than the rest and situated in following positions (1) above eye close to antennal groove, (2) a short distance below first bristle in anterior

row, and (3) in front of the eye at the base of maxilla. Occiput with two oblique rows of bristles, each containing 10; submarginal row of 10 strong bristles; single large bristle above middle of antennal groove; 13-15 small bristles along antennal groove. Mouth parts as in the female. Antenna with 8 small bristles along margin of second segment, the longest of which does not reach beyond first segment of club.

*Thorax*.—Pronotal comb with 18 spines, 3 less than in female.

*Abdomen*.—All tergites bear 2 rows of bristles, with abbreviated third row in front. Tergites I to IV with vestigial combs of 1 spine each side. Tergite VII

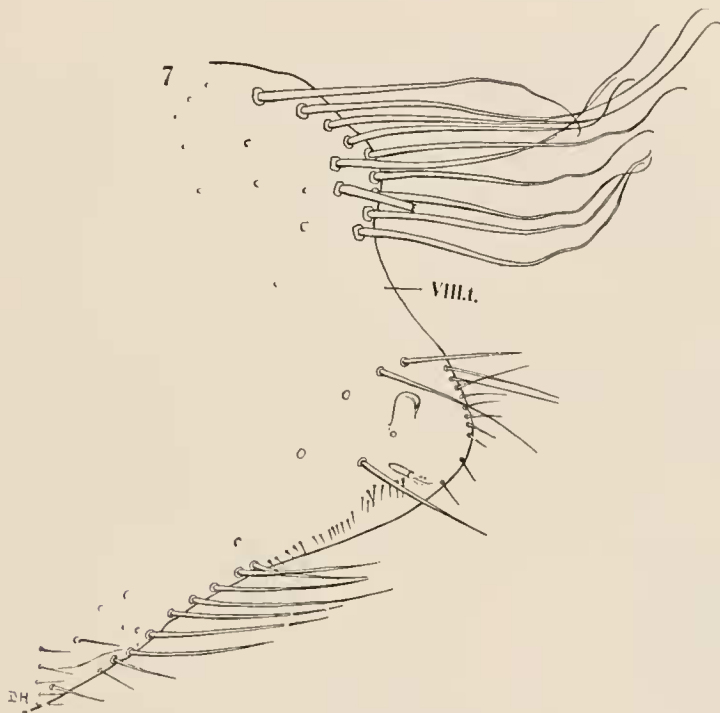


FIG. 7.—*Acanthosylla woodwardi*, abdominal tergite VIII of ♂.

has complete row of posterior bristles, one of them placed below the stigma. Two antepygial bristles, inner bristle shorter; ratio 5 : 7.

*Legs* as in ♀.

*Modified Segments*.—Upper portion of sternite VIII bears a submarginal row of 9 long whip-like bristles (text-fig. 7), close to it 3 more similar bristles and on lateral surface about 20 additional bristles scattered over the surface; lower portion somewhat resembles that of *A. rothschildi* Rainbow 1905, except that ventral margin is incurved from apex to half-way along its length. Margin in this region set with 9 very stout closely set bristles and several additional smaller submarginal bristles; apex of this ventral portion forms rounded lobe which is set with marginal row of 8 to 10 bristles which decrease in size from above downwards; just below this is an internal incassation which marks the end of a

submarginal row of small bristles on the inner surface of the sternite. Clasper (text-fig. 8) large; upper distal angle produced into strongly chitinised process P about twice as long as broad (at the base); ridge on inner surface studded with hairs, and a few fine bristles at the apex. Extreme posterior margin of clasper strongly convex. Finger F very large; in general build it resembles that of *A. saphes* J. & R. 1922; apex broadly triangular in shape, projecting well beyond lower portion of clasper; upper margin set with a submarginal row of small pale spines, while posterior margin bears a submarginal row of 14 stout bristles; a few fine bristles sparsely scattered over outer surface. The general shape of vertical arm of sternite IX recalls that of *A. saphes*; posterior margin forms

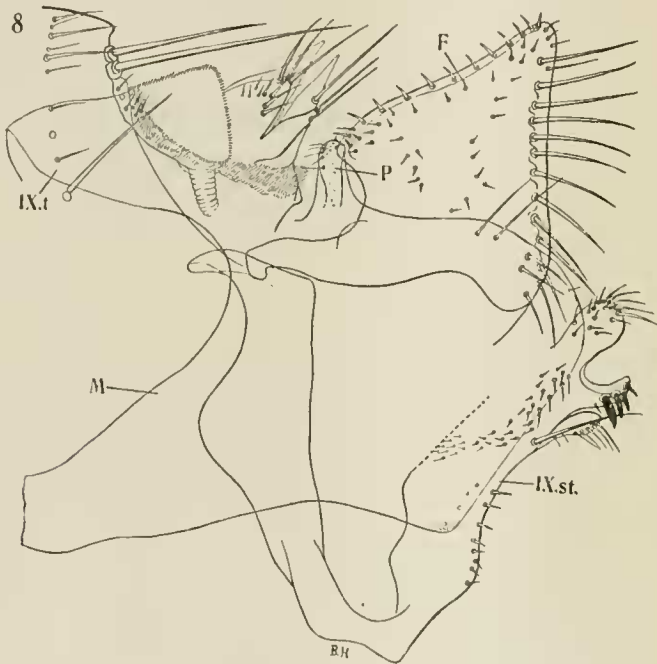


FIG. 8.—*Acanthopsylla woodwardi*, end-segments of abdomen of ♂.

nearly straight line, only slightly concave, reaching from posterior apical corner to elbow; anterior apical angle prolonged into a long curved nose; anterior margin deeply concave below nose and then slightly dilated before elbow, which is narrowest portion of sternite. Upper margin of horizontal arm membranous. Ventral margin almost straight, convex, a short distance beyond elbow, from which points extends a marginal row of short fine bristles. Terminal portion divided into 3 lobes (each side); most ventral lobe poorly chitinised and curved downwards, bearing 4 downwardly curved bristles at posterior extremity; second lobe bears a rake of 4 spiniform bristles which decrease in size from below upwards; a deep sinus separates this from third (uppermost) lobe, which is spatulate and covered with bristles, the heaviest of which are marginal in position. From the base of this lobe an irregular band of backwardly curved small bristles passes diagonally across outer surface of horizontal arm on to membranous portion of upper margin. Stylet-like lateral process of anal tergite bears 2 stout bristles



at apex. Paramere and lamina of penis generally resemble those of *A. rothschildi*; hood of paramere more rounded and lacks backwardly projecting hook-like process on upper margin; apex of ejaculatory duct exceptionally long, being seven times as long as it is broad at the base; in *A. rothschildi* it is approximately three times as long as broad.

Length: 3 mm.

Dr. Jordan suggests that this is the true male of *A. woodwardi*. The species described as such (1923, *Ectoparasites*, vol. i, p. 304) off *Conilurus albipes* Liechtenstein 1834, from Franklin Isle, I propose to rename ***Acanthopsylla franklinensis*** nom. nov.

### ***Glauertia* gen. nov.**

This very interesting genus at first sight recalls *Leptopsylla* Rothschild 1911 on account of the shape of the head, but in all other respect agrees closely with the Australian genus *Acanthopsylla* J. & R. 1922. It is easily distinguished from *Leptopsylla* by the convex pygidium and the absence of the comb on the outer dorsal edge of the tibiae. It chiefly differs from *Acanthopsylla* in the shape of the head, the frons being angulated at  $\frac{2}{3}$  from the ventral angle. The antennal groove extends to the vertex, nearly as in *Leptopsylla*, whereas in *Acanthopsylla* there is only a trace of the suture.

### **6. *Glauertia scintilla* spec. nov. (text-figs. 9-12).**

A series of 1 ♂ and 5 ♀♀ off *Dromicia concinna* Gould 1845, from Tambellup.

♂♀. *Head*.—Frons angulated at  $\frac{2}{3}$  from the ventral angle, lower portion inclining backwards. Frontal angle most forward portion of head; 4 bristles of anterior row, 2 above and 2 below angle, are spiniform; anterior row of bristles contains 5 strong bristles,

1 above and 4 below spiniforms; in addition numerous small fine bristles scattered over the frons, and there are long stout bristles in the following position: (1) on level with 4th spiniform about midway between anterior edge of antennal groove and edge of frons, (2) close to antennal groove a little distance above eye, (3) in front of eye, above maxilla, (4) immediately above maxillary palps. Eye well

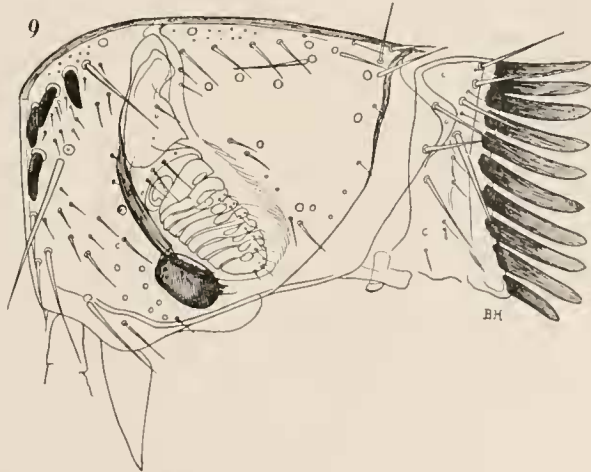


FIG. 9.—*Glauertia scintilla*, head of ♂.

developed, but slightly reduced in size, placed low down in front of base of forecoxa. Occiput with 2 complete, almost horizontal, rows of bristles containing together about 10 bristles (each side of head); submarginal row of 12 strong and a few weak bristles; row along antennal groove containing 8 small and 2 long bristles. Antenna of ♂  $\frac{1}{2}$  as long again as that of ♀, which is

subglobose; segment I bears 2 or 3 minute bristles; segment II bears 5 bristles along apical margin, reaching to second segment of club in ♂ and third in ♀. Maxillary palps reach to  $\frac{1}{2}$  length of forecoxa in ♂, and  $\frac{3}{4}$  in ♀, segment IV being longest; ratio of segments: 7, 7, 5, 9. Maxilla rather small, reaching to end of segment III of palp. Labial palps have 5 segments resembling those of *Acanthopsylla*, reaching to  $\frac{1}{5}$  length of forecoxa.

*Thorax*.—Pronotum short, being only  $\frac{3}{8}$  length of comb, and with comb about  $\frac{1}{2}$  as long as mesonotum; comb with 20 teeth; two rows of bristles in

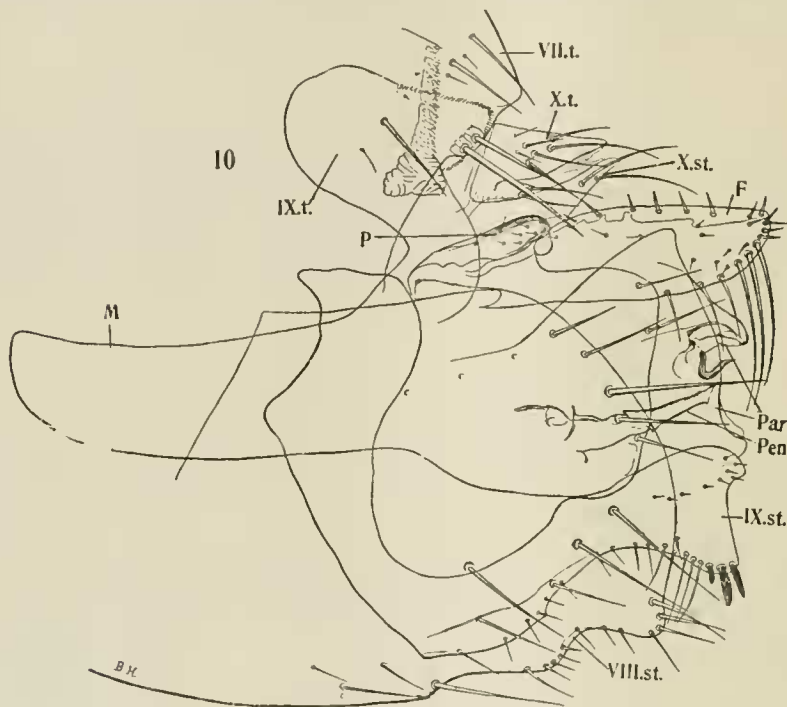


FIG. 10.—*Glauertia scintilla*, end-segments of abdomen of ♂.

front of comb, anterior row containing about 6, posterior row 10 bristles. Mesonotum with two rows of 10 bristles and 1 or 2 bristles in front of these representing an anterior row. Mesopleura with 6 strong and 1 fine bristle. Metanotum about  $\frac{1}{8}$  shorter than mesonotum; two rows of bristles with vestigial third row of 1 or 2 bristles, first row with 10, second row with 11 bristles. Metepisternum with one long and one short bristle. Metasternum with one bristle. Metepimerum with 7 or 8 strong bristles and a few slender hairs.

*Abdomen*.—Tergites I to VII with two rows of bristles, anterior row containing 9, except segments VI and VII with respectively 6 and 12; a few bristles anteriorly represent a third row on anterior segments. One of the long bristles of posterior row placed below stigma. In ♀ stigma placed considerably farther anterior on tergites II to VI. Row of bristles on tergite VII incomplete, having only 4 strong bristles (each side) instead of 6. Thus there is no bristle below the stigma of this segment. Antepygidial bristles 2 each side, the inner being twice as long as the outer. Tergites II and III with vestigial comb. Basal sternite



with ventral pair of bristles and minute bristle in front in ♂ and 0 to 5 in ♀. Sternites III to VII with row of 6 to 8 strong bristles and in front 4 to 8 small bristles.

*Legs.*—Generally resemble those of *Acanthopsylla*. Forecoxa carries about 21 strong bristles on outer surface in addition to those of posterior margin. Midcoxa with 5 bristles forming a submarginal row on outer surface (apart from apical and marginal bristles). Hindcoxa with 6 or 7 bristles arranged in two rows on outer surface (apart from apical and marginal bristles). On inner side, close to apex, about 7 rather fine bristles. Forefemur with 6 to 8 fine bristles on outer surface and 2 on inner surface. No lateral bristles on mid- and hind-femora. Foretibia with bristles along hindmargin arranged in six incisions, 2 bristles each. Inner bristles of incision three and five, weak; additional fine bristles beside these incisions; a lateral row of 5 bristles; longest bristle of seventh incision in all tibiae about as long as first segment of tarsus. Midtibia with seven incisions; lateral row of 8 bristles. Hindtibia resembles midtibia; 10 lateral bristles. First three segments of foretarsus nearly equal in size, fourth smallest, fifth longest; two bristles longer than rest present on posterior margin of first segment; fifth segment bears 6 pairs of lateral bristles, first and third pairs being shifted slightly inwards, and fourth being subdorsal, sixth pair relatively weak. Four small apical spines in ♂ and two in ♀. Ratio of segments:

	Foretarsus	Midtarsus	Hindtarsus
♂	10 : 11 : 10 : 7 : 18	24 : 19 : 13 : 9 : 18	51 : 35 : 20 : 11 : 20
♀	12 : 13 : 11 : 8 : 18	26 : 21 : 14 : 10 : 18	59 : 38 : 21 : 12 : 22

*Modified Segments.*—♂ (text-fig. 10). Tergite VIII large. Cavity of stigma very long, reaching to dorsal edge of segment. Posterior margin marked by row of 4 strong bristles. Fourteen other strong bristles scattered somewhat irregularly over outer surface. Over 30 sensory pits on pygidium, which is strongly convex. Sternite VIII large, bearing about 16 bristles apart from the ventral marginal ones, 3 or 4 forming a submarginal row; ventral margin with two deep incurvings or shallow sinuses; a long strong bristle situated immediately before first sinus, which is the shallower of the two; 5 short bristles present between this and second sinus, in a row, the most anterior being the longest; apex is produced into rounded lobe set with 3 strong marginal bristles and a small one; a few fine bristles present along margin of second sinus. Manubrium broad and as in *Stivalius* resembles lamina of penis in shape. Clasper large; its dorsal angle produced into a strongly chitinated process P, with a few minute bristles on outer surface; lower angle round; a fairly stout bristle placed half-way along posterior margin and 2 slender bristles near dorsal angle, which is also rounded. Exopodite F rather slender; base narrow, the F suddenly broadens above P on dorsal side, being in this region a little more than  $\frac{1}{4}$  as broad as long; dorsal apical margin set with row of small pale spiniforms; ventral (= posterior) margin at the apex bears 3 long stout bristles and several finer ones. Vertical arm of sternite IX resembles that of *Acanthopsylla rothschildi* Rainbow 1905, frontal angle of upper end being produced into a long pointed nose; portion adjoining horizontal arm is narrowest part of sternite. Horizontal arm slightly shorter than vertical arm; protrusion present on upper margin immediately before it broadens out to form apical portion, which is roughly triangular in

shape; ventral apical angle more heavily chitinised and in addition to several slender hairs bears 3 spiniform bristles; upper angle projects rather distad, is feebly chitinised and bears a number of minute bristles; a few finer bristles are scattered sparsely over anterior portion of ventral arm, chiefly along ventral margin. Tergite X with fan-like arrangement of rather widely separated bristles on dorsal surface, with a lateral process as in *Stivalius* somewhat resembling

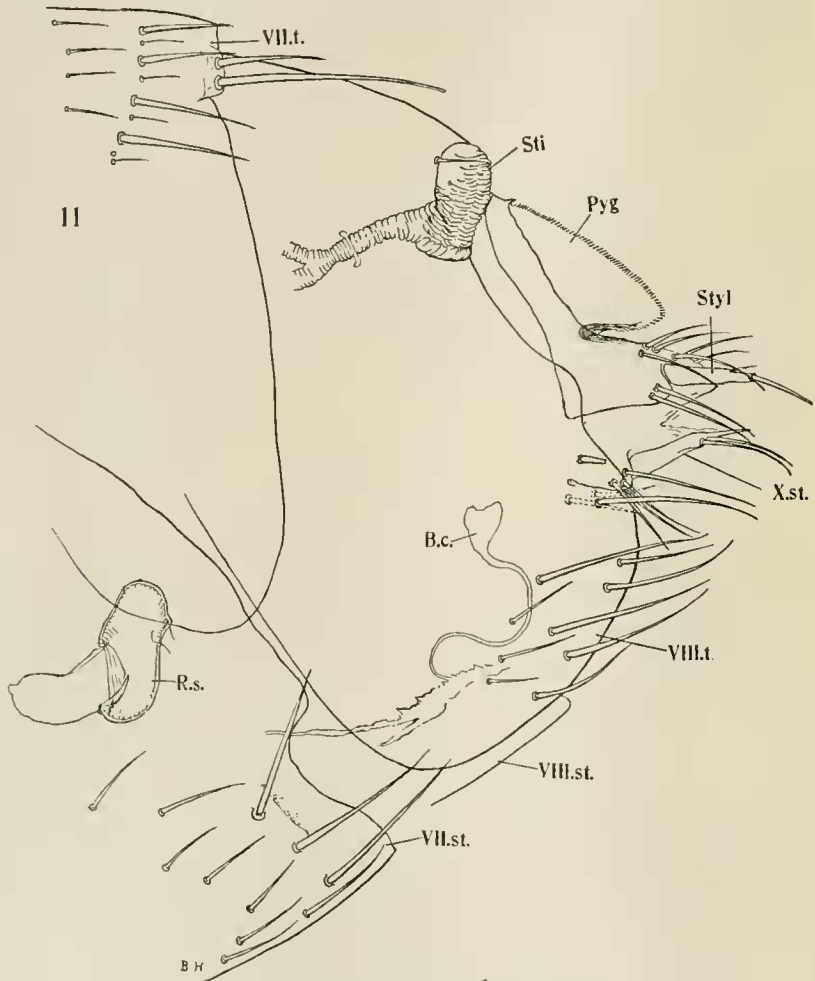


FIG. 11.—*Glauertia scintilla*, end-segments of abdomen of ♀.

stylet of female. Sternite X bears 2 strong bristles each side. Tendons of penis reach frontad beyond lamina of penis. Terminal portion of ejaculatory duct conical and strongly chitinised, with dorsal and ventral tooth. Lamina narrow posteriorly, but broadens out into paddle-shaped sclerite, the anterior end of which terminates in a pointed hook turned upwards, strongly recalling that of the allied genera *Stivalius* and *Pygiopsylla*. Paramere also resembles that of latter genus; claw-like hook present at posterior extremity pointing downwards, and a tooth-like projection immediately below it, these forming together a pincer-

like structure. Membranal hood of paramere large and ventrally produced into an extensive flap.

♀. Sternite VII (text-figs. 11, 12) with 6 strong bristles in apical row. Before this between 14 to 23 bristles. Upper portion of apical margin slanting and about middle, somewhat convex. Sinus of medium depth somewhat variable in shape. Deepest above, strongly rounded, gradually becoming shallower ventrally. Lobe above sinus broadly rounded, projecting about as much as ventral lobe which is almost triangular in lateral aspect. A faint indefinite internal incrossation present on inner surface of segment situated at the sinus. Tergite VIII with ventral apical

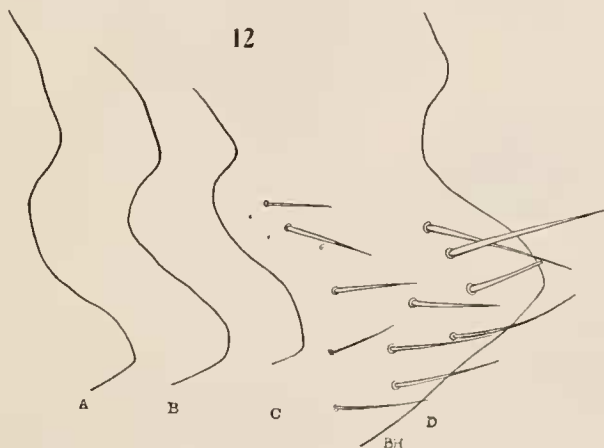


FIG. 12.—*Glauertia scintilla*, abdominal sternite VII of 4 ♀♀.

angle strongly rounded off. Apical margin slightly incurved below upper angle. Comparatively few bristles present. Outer surface bears 8 strong bristles and 4 to 6 smaller ones. Three strong bristles on inner surface near upper apical angle one behind the other, and a pale marginal bristle above ventral apical angle. Cavity of stigma only a little more than half as long as in ♂. Three minute bristles immediately in front of it. Upper margin of tergite X bears row of bristles and 2 bristles on the ventral surface below base of stylet. Anal segments greatly resemble those of *Acanthopsylla*. Sternite X bears a brush of 4 to 5 long bristles on proximal projection. Two curved bristles subapically each side. Stylet very slender, 4 times as long as broad at base. Stout bristle at extremity not quite double the length of stylet. Receptaculum seminis resembles that of *Acanthopsylla*. Tail deeply inserted in head and being  $\frac{1}{3}$  shorter than the latter. Tail  $\frac{1}{3}$  as wide as long, bearing small projection at anterior extremity. Head constricted and strongly ventricose near tail. Bursa copulatrix pear-shaped.

Length : ♂ 2.2 mm. ; ♀ 2.5 mm. to 3.2 mm.

#### 7. *Leptopsylla segnis* Schönh. 1811.

1 ♀, off *Nyctinomus albidus* Leech 1884, from Dangin. A record of the mouse flea on the bat is interesting ; but its occurrence on this host is certainly accidental.

#### 8. *Ischnopsyllus caminae* Rothschild 1903 (text-figs. 15, 18).

1 ♀, off *Chalinolobus morio* Gray 1841, from Irwin River, near Geraldton.

9. *Ischnopsyllus bathyllus* nov. spec. (text-figs. 13, 14, 17).

This species, of which 2 ♀♀ were obtained off *Nyctinomus australis* Gray 1838, is closely related to *Ischnopsyllus caminae* Rothschild 1903, with which it

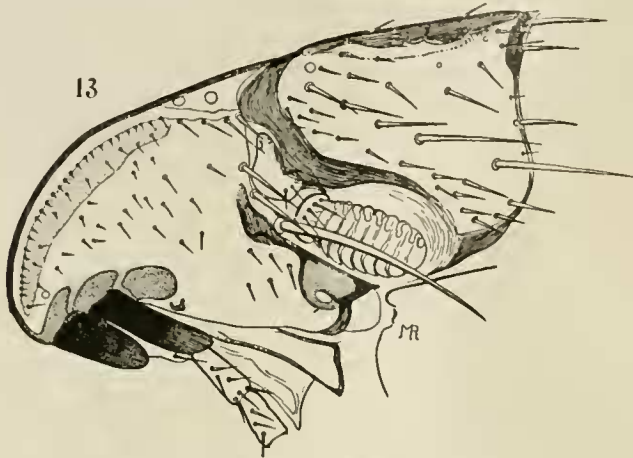


FIG. 13.—*Ischnopsyllus bathyllus*, head of ♀.

is compared throughout the following description. On the whole it is a more heavily chitinised species, with rather more numerous bristles.

*Head*.—Frons more rounded; anteorar incassation following contours of

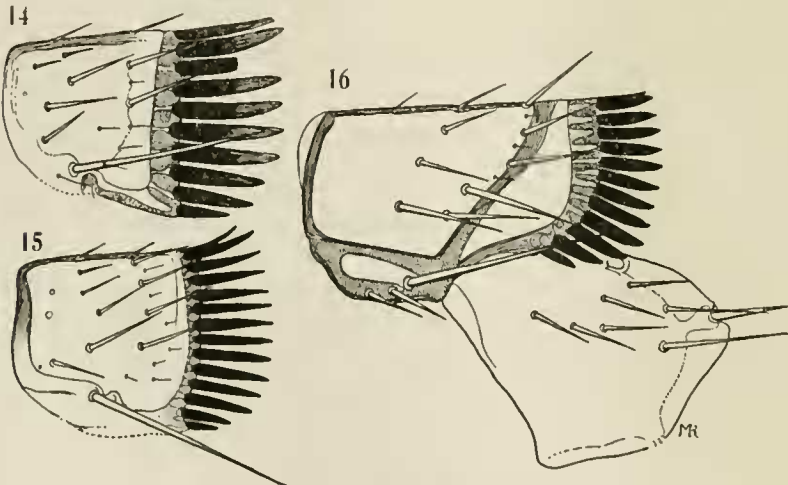


FIG. 14.—*Ischnopsyllus bathyllus*, metanotum.

FIG. 15.—*Ischnopsyllus caminae*, metanotum.

FIG. 16.—*Ischnopsyllus carinus*, metanotum and metepimerum.

frons broader. Small bristles on frons rather more numerous and stronger. Genal spines of stronger, blunter build, with ends more rounded; anterior spine larger in comparison with posterior spine. Preoral tuber broader. Eye more distinct. Ooeiput with 12 bristles along posterior margin of antennal groove;

in *Ischnopsyllus caminae* only 5 to 7. Shallow incrassation present on dorsal margin of occiput as well as pronotum half-way along its length.

*Thorax*.—Hindmargin of pronotum straight, whereas in *I. caminae* it is curved. Pronotal comb with 22 to 24 spines, the spines set in a straight row following the margin of the pronotum. Mesosternite bears more bristles, 12 to 16 (each side). Metanotal comb has only 18 to 20 spines, the comb stopping at ventral angle of tergite. Metepisternum slightly narrower (dorso-ventrally), bearing one strong bristle and one small fine one. Metepimerum with 12 bristles.

*Abdomen*.—Vestigial comb of first tergite missing. Number of teeth in other five combs are in the two specimens 14 (17), 13 (14), 11 (10), 11 (10), 11 (12); which is considerably less than in *I. caminae*. Sternites III–VI with 6 to 8 bristles, at least some of the sternites with 8, whereas in the examples of *I. caminae* in the N. C. Rothschild collection there are only six bristles on the sternites.

*Legs*.—Chaetotaxy of legs resembles that of *I. caminae*, but proportion of tarsal segments different. Long bristle on hindmargin of forecoxa placed higher up. Proportion of foretarsal segments: 13, 15, 13, 10, 19; in *I. caminae* 10, 10, 8, 5, 11. First segment of mid- and hindtarsus less than twice the length of fifth segment; in *I. caminae* more than twice the length.

*Modified Segments*.—Number of bristles on sternite VII (text-fig. 17) very variable. Apical sinus deeper and broader. Outline of tergite VIII not very distinct. Apical margin marked by a row of six bristles. Fourteen bristles scattered irregularly over whole outer surface and six smaller bristles on inner surface near margin. Tergite X bears numerous short fine bristles scattered all over the surface, of which none are as long as terminal bristle of stylet. Sternite X bears several long stout marginal bristles and five lateral bristles (each side), of which one or two are longer than terminal bristle of stylet. Stylet approximately twice as long as wide at base. Receptaculum seminis with head and tail longer than in *I. caminae* (text-fig. 18); head being twice as long as broad.

Length: 2.2 mm. Locality: Carnamah, 150 miles N. of Perth.

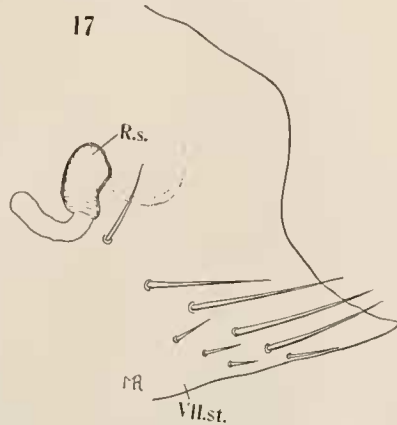


FIG. 17.—*Ischnopsyllus bathyllus*, abdominal sternite VII and receptaculum seminis.

#### 10. *Ischnopsyllus earinus* nov. spec. (text-figs. 16, 19).

This species closely resembles the ♀ of *I. caminae*, but there are probably much more distinctive characters in the unknown male. The single specimen was obtained off *Eptesicus pumilus* Gray 1841 at Tambellup.

*Head*.—Tuber behind genal spines broader than *I. caminae*.

*Thorax*.—Pronotal comb with only 26 spines. Mesopleura with 12 to 14 bristles (each side). Metanotal comb curved as in *I. caminae*, with 27 spines. Metepisternum with two small bristles in addition to single large one. Metepimerum with 8 bristles.

*Abdomen*.—Vestigial comb of tergite I represented by one spine each side.



Number of teeth in following combs 23, 22, 21, 20, 20 (in the two sides together). Chaetotaxy of sternites resembles that of *I. bathyllus*.

*Legs*.—Chaetotaxy as in *I. caminae*, but proportion of segments of tarsi intermediate between *I. caminae* and *I. bathyllus*. Segment II of foretarsus longer than I, but midtarsal segment V half the length of I. Fifth hindtarsal segment V less than half length of I.

*Modified Segments*.—Sternite VII with two, somewhat irregularly arranged,

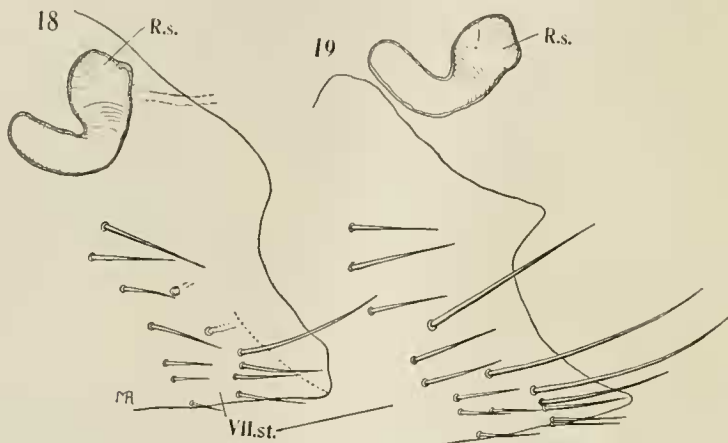


FIG. 18.—*Ischnopsyllus caminae*, abdominal sternite VII and receptaculum seminis.

FIG. 19.—*Ischnopsyllus earinus*, abdominal sternite VII and receptaculum seminis.

rows of bristles, anterior row containing 10, posterior row 7 bristles (each side). Lobe above sinus projects farther than in *I. caminae*, and its apex is pointed. Tergite VIII resembles that of *I. caminae* in outline, but the number of bristles is much larger, approximately 25 bristles being scattered irregularly over outer surface, 3 or 4 of these situated close together immediately below pygidium and placed in a vertical row (not horizontal, as in *I. caminae*); row of 12 closely set bristles near posterior margin.

Length : 2.3 mm.

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